



A.D. 1874, 20th JANUARY. N° 255.

SPECIFICATION

OF

MILLINGTON HENRY SYNGE.

DRAINAGE OF HOUSES AND STREETS.

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Drainage of Houses and Streets.

LETTERS PATENT to Millington Henry Synge, of the United Service Club, Pall Mall, in the County of Middlesex, Major-General Royal Engineers, for the Invention of “**IMPROVED APPARATUS FOR FILTERING AND PURIFYING THE DRAINAGE OF HOUSES AND STREETS.**”

Sealed the 7th July 1874, and dated the 20th January 1874.

PROVISIONAL SPECIFICATION left by the said Millington Henry Synge at the Office of the Commissioners of Patents, with his Petition, on the 20th January 1874.

I, **MILLINGTON HENRY SYNGE**, of the United Service Club, Pall Mall, 5 in the County of Middlesex, Major-General Royal Engineers, do hereby declare the nature of the said Invention for “**IMPROVED APPARATUS FOR FILTERING AND PURIFYING THE DRAINAGE OF HOUSES AND STREETS,**” to be as follows:—

It is well known that by submitting the fluid portions of house 10 drainage to the action of proper filtration it may be rendered perfectly innocuous and available for the watering of roads, the cleaning of streets, and kindred uses.

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In order to attain this result in an efficient and economical manner I propose to group together a given number of houses for the purpose of draining them into a series of filtering tanks, which may be arranged wholly or partially under the footway. Access will be given to these tanks by means of man-holes, which may be protected if thought 5 desirable by filtering traps such as I have described in a Provisional Specification bearing even date with this application.

The first filtering tank into which the house drainage enters near the upper part thereof I propose to fit with a vertical partition, leaving a space at the bottom for the ascent of the liquid to the other side of the 10 partition. This tank will be filled with smooth stones or boulders, which will serve to break the rush of the liquid and cause it to deposit any solid matters which it may bring into the tank.

The second tank will be constructed like the first, but of less depth, and the partially filtered liquid will enter from the first tank to the 15 second near the upper part thereof. This tank may be charged with coarse gravel, or sand, or brick, or burnt clay, and the liquid will take a serpentine course through it and discharge into say a third tank of similar construction, but of still less depth. This tank may be charged with sand, and burned clay, and the liquid will take a serpentine course through 20 it as through the other tanks of the series and discharge into a tank in the middle of which is built up a well of porous brick, lined inside with a charcoal filter.

Over this well is placed a pump for elevating the water as it finds its way into the well and discharging it by a hose or otherwise for street 25 cleansing, for washing the outside of houses, and for other uses.

I may remark that the number of tanks in the series, and also the materials with which the tanks are severally charged will depend upon the purity of water required from the filtering process.

In dealing with the surface water of streets I construct in front of the 30 line of houses and below the pavements continuous galleries or a series of shafts. These will contain from the top downwards first an ordinary covered gutter, the bottom of which is formed by movable gratings arranged so as to break joint, and leaving a space between them. Beneath this gutter is formed a filter of boulders underlaid by a like 35 grating, followed again by a filter of coarse gravel, which is underlaid

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again by a grating as before, followed by an interval over a filter of burnt clay, sand, and porous brick over a grating as before, under which is a chamber for the purified water.

Receiving tanks with pumping stations are to be provided at intervals 5 with which any desired amount of final charcoal filtration may be connected.

This arrangement provides for a lateral movement and a downward mechanical filtration being carried on at the same time.

By forming the galleries or shafts with vertical sides every portion of 10 the filtering apparatus can be removed for cleaning and replaced without difficulty, and without at any time causing general derangement the whole may be kept in constant good order. The upper gutter is brought to a level with the lower side of the footway curbstone.

In highly arched and badly formed roadways the gutter is protected 15 and the slush collected and at the same time prevented from choking the gutter or the channel by a series of one or more strong iron gratings resting on sleepers and cross pieces till the level portion of the road is met. Or a preferable mode is a movable curved grating, which may be slidden under the gutter cover when the scavenger is removing the 20 accumulation.

The filter may be made of any form, but if the egg, circular, or oval form be adopted the inner gratings require to be divided and the parts separately supported, and the advantage of complete identity and perfect interchangeableness are sacrificed.

25 SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Millington Henry Synge in the Great Seal Patent Office on the 20th July 1874.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, MILLINGTON HENRY SYNGE, of the United Service Club, Pall Mall, in the County of 30 Middlesex, Major-General Royal Engineers, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twentieth day of January, in the year

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of our Lord One thousand eight hundred and seventy-four, in the thirty-seventh year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Millington Henry Synge, Her special licence that I, the said Millington Henry Synge, my executors, administrators, and assigns, or such others as I, the said Millington Henry 5 Synge, executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for 10
“IMPROVED APPARATUS FOR FILTERING AND PURIFYING THE DRAINAGE OF HOUSES AND STREETS,” upon the condition (amongst others) that I, the said Millington Henry Synge, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, 15 and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Millington Henry Synge, do hereby declare the nature of my said Invention, and in what manner the 20 same is to be performed, to be particularly described and ascertained in and by the following statement, reference being had to the Drawing hereunto annexed, and to the letters and figures marked thereon (that is to say) :—

It is well known that by submitting the fluid portions of house 25 drainage to the action of proper filtration it may be rendered perfectly innocuous and available for the watering of roads, the cleansing of streets, and kindred uses.

In order to attain this result in an efficient and economical manner, which is the object of the first part of my Invention, I propose to drain 30 single houses or groups of houses by connecting them with a series of filtering tanks which may be arranged wholly or partially under the footway. Access will be given to these tanks by means of man-holes, which may be protected if thought desirable by deodorant traps such as I have described in the Specification of a Patent bearing even date 35 herewith.

In the accompanying Drawing Fig. 1 shews in longitudinal section a series of filtering tanks arranged according to my Invention for receiving

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the drainage from sinks, bath water, and soapy water discharged from dwelling-houses.

A is the first filtering tank, into which the house drainage enters near the upper part thereof. This tank is fitted with a vertical partition *a*,
5 which divides the tank into two chambers, leaving however a space at the bottom for the passage of the liquid from the first chamber to that on the other side of the partition. The chambers of this tank will be filled through the man-holes *b, b*, with smooth stones or boulders, which will serve to break the rush of the liquid as it enters by the pipe *c*, and
10 cause it to deposit any solid matters which it may bring into the tank.

B is a tank adjoining the tank A, and constructed somewhat like the first, with an equal capacity but a diminished depth. Into this tank B the partially filtered liquid will flow (from the tank A) through an opening *d*
15 in the dividing wall. This tank may be charged with coarse gravel, or sand, or brick, or burnt clay, and the liquid will take a serpentine course through it and discharge into say a third tank C of similar construction of still less depth but of like capacity. This tank may be charged with sand and burnt clay, and the liquid will take a serpentine course through it
20 as through the other tanks of the series (an opening being made for that purpose at the foot of the partition wall), and discharge into a tank D. In the middle of this tank is built up a well E of porous brick, lined inside with a charcoal filter F.

Over this well is placed a pump G for elevating the water as it finds
25 its way into the well, and discharging it by a hose or otherwise for street cleansing, for washing the outside of houses, and for other uses.

I may remark that the number of tanks in the series, and also the materials with which the tanks are severally charged, will depend upon the purity of water required from the filtering process, and that the
30 series may be modified by the introduction of a tank charged with deodorant materials, the same acting upon the water by precipitation.

In dealing with the surface water of streets, which forms the subject of the second head of my Invention, I construct in front of the line of houses and below the pavement continuous filtering galleries or a series
35 of filtering shafts for receiving the surface water.

One mode of carrying out this part of my Invention is shewn at Fig. 2, which represents in sectional elevation one of two filtering

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galleries with which it is proposed to provide the streets of a town say immediately below the kerbs of the street, and also the parts in connection with such gallery; H, H, are the side walls of the gallery, and I is a tunnel on a level with the bottom thereof through which the water as it is filtered flows away. 5

The gallery is covered at top by removable gratings K, which are set at or a little below the street level and take the place of the ordinary gutter. These gratings are covered by curved gratings K¹, which may be hinged, as shown in the Drawing, to give ready access to the gallery below. Their use is to keep back all matters that might tend to close 10 the gratings K and impede the flowing of the surface water into the filtering gallery. Immediately beneath the grating K is a double grating L formed of two perforated plates set one above the other, and serving to catch and retain solid matters that may have found their way through the grating K. Below this double grating is formed a filter of 15 boulders underlaid by a double grating L¹, which is followed again by a filter of coarse gravel. This gravel is underlaid by a double grating L² as before, the space between these double gratings serving for the accumulation of the water in course of filtration. The filling below the grating L² is a filter of burnt clay, sand, and porous brick, which is 20 supported by a grating of perforated plates L³ as before. Under this grating is a chamber M for receiving the purified water.

Collecting tanks with purifying stations are to be provided at intervals, with which any desired amount of final charcoal filtration tanks or tanks for precipitation may be connected. 25

The above-described arrangement provides for a lateral movement and a downward mechanical filtration being carried on at the same time.

By forming the galleries or shafts with vertical sides every portion of the filtering apparatus can be removed for cleaning and replaced without 30 difficulty and without at any time causing general derangement the whole may be kept in constant good order.

It may be convenient to substitute for the ordinary kerbstone a chamber of cast iron as shewn at N for the reception of the water, gas, and telegraph pipes, the same being continued along the run of the 35 street.

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It is chiefly in highly arched and badly formed roadways that the curved grating K¹ is required for collecting the slush, and at the same time preventing it from choking the channel.

The street filters may be made of any desired form, but if the egg, 5 circular, or oval form be adopted the inner gratings require to be divided and the parts separately supported, and the advantage of complete identity and perfect interchangeableness are sacrificed.

Having now set forth the nature of my Invention of "Improved Apparatus for Filtering and Purifying the Drainage of Houses and 10 Streets," and explained the manner of carrying the same into effect, I wish it to be understood that under the above in part recited Letters Patent I claim,—

First. The apparatus above described for treating fluid portions of house drainage and utilizing the same in the manner above set forth.

15 Secondly. The means above described for dealing with the surface water of street and ways.

In witness whereof, I, the said Millington Henry Synge, have hereunto set my hand and seal, the Twentieth day of July, in the year of our Lord One thousand eight hundred and seventy- 20 four.

MILLINGTON HENRY SYNGE. (L.S.)

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